

pine and Douglas fir to the highest summits. It is particularly abundant on rocky alpine slopes and, in some cases, is the most abundant understory plant with Engelmann spruce at timberline. This is believed to be the first report of this species for Idaho.

*Gentiana tenella* Rottb. Custer Co., E slope Lost River Range, Challis Nat. Forest, moist, grassy bank of Pass Lake near outlet, head of W Fork Pahsimeroi River, 3079 m, 15 August 1973, 1169. This species is apparently rare in Idaho for searches of Pacific Northwestern herbaria (ID, IDS, WS, and WTU) and NY have failed to produce a single Idaho specimen. Hitchcock and Cronquist (op. cit.) indicate that it is reported from Idaho.

*Langloisia punctata* (Cov.) Goodd. Clark Co., Dry, rocky soil at Reno Point, S end of Beaverhead Range, 1646 m, 9 July 1975, 2604. This is a rather substantial population of several hundred plants and represents a significant N extension of its range. It has not previously been reported from Idaho although its occurrence has been noted in SW Idaho by Dr. Patricia Packard (pers. comm.).

*Phacelia incana* Brand. Clark Co., W slope of S Beaverhead Range Targhee Nat. Forest, moist limestone talus, Bare Canyon, 2103 m, 22 June 1975, 2482; limestone rocks at Reno Point, 1648 m, 9 July 1975, 2606. This species was previously known in Idaho only from a few collections and is rare in the state. The collections cited are populations composed of very few, widely scattered plants.

*Phacelia lyallii* (Gray) Rydb. Lemhi Co., E slope Lemhi Range, Salmon Nat. Forest, talus slope on saddle connecting Mill Lake with E Fork Hayden Creek, 2877 m, 1 August 1974, 2135. Gillett (Rhodora 62:205-222. 1960) reported two locations for this species in N Lemhi Co. Neither Davis (op. cit.) nor Hitchcock and Cronquist (op. cit.) indicate its presence in Idaho.

*Pedicularis contorta* Benth. var. *ctenophora* (Rydb.) Nels. & Macbr. Lemhi Co., E slope Lemhi Range, Targhee Nat. Forest, grassy slope of peak 10,652. 3 km NW of junction of Meadow Canyon and South Fork, 2746 m, Sec 21, T11N, R28E, 24 July 1795, 2859. The collection cited represents a W extension of the range of this variety of only about 75 km, but it has not previously been reported for Idaho. This plant is abundant in the Meadow Canyon area but has not been encountered elsewhere in the region. — DOUGLASS M. HENDERSON, Department of Biological Sciences, University of Idaho, Moscow 83843.

## REVIEWS

*Terrestrial vegetation of California*. Ed. by MICHAEL G. BARBOUR and JACK MAJOR. + map of the natural vegetation of California (1:1,000,000) by A. W. Küchler. John Wiley and Sons, New York. 1977. \$47.50.

California is one of the most diverse of states geologically, climatically, and biologically. In what other state than California grow plants of more than 5,000 native species? And in how many intricate ways do these plants become arranged into vegetational communities from tall forests to the almost barren bajadas of extreme deserts? From chaparral to alpine fell fields? Who would dare to make order out of such ecological chaos? Two people did, and to them we are indebted for this book. Without the leadership of Barbour and Major, *Terrestrial Vegetation of California* could not have been produced, even given the wealth of material and the cooperation of knowledgeable colleagues.

The wealth of plant species in the California Floristic Province, the endemics, the intricate genetic relationships, and the combination of rock and climate led to the dominance of taxonomy in California at mid-century and to the rise of biosystematics. Because of this natural pre-occupation with flora and its evolution, it is not too surprising that research on vegetational structure and classification in California was somewhat neglected, especially by academic scientists. This book could not have been written even as recently as twenty years ago. It comes none too early

in a region where even its ecologically enlightened people have overwhelmed many of the native biological communities.

The book is packed with information: 26 chapters, more than 1000 pages, and the large useful map. The introductory overview alone consists of six chapters and 220 pages, a book in itself. Do you want to know something about the California climate? Read Jack Major's Chapter 2. How about the flora? Peter Raven's Chapter 4. And what about California's paleoecology? Dan Axelrod's Chapter 5 comes as close in short space to summarizing the great changes that have taken place in western North America during the Tertiary and Pleistocene as could be done without writing a separate book. I notice only one omission in the overview section that would be helpful in such a relatively dry region — a chapter on the hard rock geology and perhaps another on the building and shaping of the mountains. Vegetation is almost as closely allied to substratum in much of California as it is to climate. Fortunately, there are very good books on California geology such as Jahn's "The Geology of Southern California" and Bailey's "Geology of Northern California".

There are 20 chapters on the main vegetational "types" of California. These are arranged into six large floristic provinces based upon their geographic affinities. Each chapter is an authoritative compilation. There is a uniform approach in all chapters, and there is cross-reference and integration among the chapters. Fortunately, no attempt was made to impose a hierarchical classification. Each chapter has one or more tables of actual vegetational data. Even though these are sometimes small samples, they provide some feeling for the vegetational and floristic structure.

There are several other things about each chapter that I like. For example, the title page of every chapter that deals with a vegetational type displays a physiographic map of California. On this map, the areas of the particular vegetation type are clearly marked. Details can be checked in Kùchler's excellent map. Each chapter includes a sampling of data (of varying richness) from physiological ecology. This is unusual in books on vegetation. Yet, if we are to understand vegetational composition, pattern, and function, we must have such information. This leads logically to another uniformity among chapters: suggestions for future research. What a gold mine of ideas for graduate students and active ecologists. All this, and the literature reviewed, too!

Further weak points are relatively minor. In such a book, one expects an abundance of clear photographs of the vegetation. There are relatively few, and the reproduction of some lacks clarity. Another money-saving device is the use of typewriter script for camera-ready tables and reference lists, which I don't begrudge.

Here, then, is a true classic that everyone interested in the Californian countryside, mountains, and deserts should have. The price? Entirely reasonable when it is realized that it is an encyclopedia of western vegetational ecology, and the book has scientific permanence. Its like will not appear again within the lifetime of its present readers. — W. D. BILLINGS, Department of Botany, Duke University, Durham, North Carolina 27706.

Ed. Note: No more than one review of a single volume is normally published in *Madroño*. However, *Terrestrial vegetation of California* is sufficiently significant as a landmark that more than one perspective is useful.

As members of (we suspect) the first upper division class to utilize *Terrestrial vegetation of California* as a text, we wish to communicate our reactions to the book. After a ten-day field trip through northern California, the class read and discussed 14 of the 20 chapters dealing with vegetation. As informed students we are meters of evaluation somewhere between the initiate and the professional botanist.

Th editors have handled burdensome layout problems well. However, there are a few prominent difficulties that must be mentioned. Most of the tables have been presented lengthwise so that they are not easily examined, and the spacing is so ex-

panded that unnecessary pages are added to an already large volume.

A. W. Küchler's "Native Vegetation of California" map is enclosed with an expanded legend in an appendix. In addition, each chapter is preceded by a diagrammatic map depicting the locations of vegetation types discussed. The latter could have been larger and more clearly contrasted for easy reference. Photographs tend to be dark, lacking in contrast, and of little assistance. Vegetation types are not consistently named throughout the book. Names should have been standardized or alternatives listed at the beginning of each chapter.

The "Research Natural Areas" and "Status of Vegetation Mapping" chapters are peripheral to the purpose of the book. The chapter on climate is essential, but lengthy and not easily read. It could have been a shorter review, as stated in the book's objectives.

Raven's discussion of California's flora in the introductory chapters is excellent, offering a good introduction to the highly endemic nature of California taxa and providing a firm basis for understanding the processes involved. Zinke's chapter, "Redwoods and Associated North Coastal Forests", lacks organization. He incompletely synthesizes a large amount of data, thus failing to guide the reader in speculation about redwood ecology.

Griffin's chapter, "Oak Woodland", is the best organized and most readable of all the contributions. He takes a ubiquitous vegetation type with little or no floristic unity and molds it into a presentation that at once gives a clear explanation of what is known (very little) and what is not known (a great deal).

"The Closed Cone Pines and Cypresses" displays the numerous problems in dealing with a difficult assemblage of arbitrary communities. Although the bibliography is superb, the chapter lacks cohesiveness and reflects a southern California viewpoint. The same bias is seen in the chaparral chapter.

Chapters on "Southern Coastal Scrub" by Mooney and "Vernal Pools" by Holland and Jain outshine others in the presentation of autecological studies. It is regrettable that knowledge of other vegetation types such as "North Coastal Scrub and Prairie" is not up to this level. The inconsistency of this last chapter may well be a reflection of its multiple authorship.

The "Montane and Subalpine Vegetation of the Sierra Nevada and Cascades" chapter presents a fine, although occasionally flawed, summary. In spite of controversy in the literature, only one interpretation of tree stand dynamics is offered.

The most important function of the volume will be as a reference rather than as a text — a kind of manual of vegetation types. Although cumbersome in the field or car, as most floras are, this book will be a valuable part of an herbarium, library, or botanist's reference shelf. A valuable feature is the extensive and current bibliography that follows each chapter.

This book is easily the best available review of California's vegetation, assembling diverse opinions and backgrounds from California's premier plant ecologists into a sizeable yet usable compendium that stimulates the reader not only to read and digest but to challenge with personal observation and research. — PETER STEKEL and EDWARD A. COPE, Department of Biology, Humboldt State University, Arcata, CA 95521.

#### MAP OFFER

The new map of the natural vegetation of California in full color at the scale of 1:1,000,000 will become available on 15 March 1978 with a brochure containing a commentary on the map and a detailed description of every vegetation type. Price: \$8 incl. brochure and postage; orders of 20 or more at a discount of 15%. Rolled maps, shipped in a tube cost \$12, postage extra. Make checks payable to A. W. Küchler and send orders with checks to A. W. Küchler, Dept. of Geography, University of Kansas, Lawrence, KS 66045.